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UPDATE

Importance, definition and conflicts of authorship in scientific publications

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Abstract

Defining authorship in scientific articles and documents is an essential and complex process that involves subjectivity and depends on largely informal agreements, which may cause conflict among researchers. Although some guidelines have been published to improve this practice, there are few quantitative procedures in the literature to specify authorship and co-authorship of a scientific paper, and there is no consensus on the definition of authors and the order in which they should be listed. With this article we try to review a few criteria and considerations for determining author lists in scientific articles.
Keywords: Authorship. Research Personnel. Authorship-Ethics. Journal article.

Resumo

Importância, definição e conflitos da autoria em publicações científicas

Definir a autoria de artigos e documentos científicos é um processo essencial e complexo, que envolve subjetividade e depende de acordos quase sempre informais, o que pode causar conflitos entre pesquisadores. Algumas diretrizes foram publicadas para aperfeiçoar esta prática, mas ainda são poucos os procedimentos quantitativos para estabelecer a autoria e a coautoria de textos científicos, e não há consenso para definir os autores e a ordem em que devem aparecer. Com este artigo, visamos recapitular alguns critérios e considerações para determinar a ordem de autoria em artigos científicos.
Palavras-chave: Autoria. Pesquisadores. Autoria-Ética. Artigo de revista.

Resumen

Importancia, definición y conflictos de la autoría en publicaciones científicas

Definir la autoría en artículos y documentos científicos es un proceso esencial y complejo, que encierra subjetividad y depende de convenios establecidos en general de palabra, lo que puede ocasionar conflictos entre los investigadores. Se han publicado algunas guías con lineamientos generales para mejorar esta práctica, sin embargo son pocos los procedimientos cuantitativos para precisar autoría y coautoría de un escrito científico, y no hay consenso para definir los autores y el orden en que deben aparecer. Con este artículo intentamos rescatar algunos criterios y consideraciones para determinar el listado de autores en textos científicos.
Palabras clave: Autoria. Investigadores. Autoria-Ética. Artículo de revista.

The authors declare no conflict of interest.

Defining who the authors of scientific articles or documents are and the order in which they should be listed is a problem delimited by ethical aspects. Failure to determine authorship before or during the development of the research may cause conflict among those responsible for the publication. Generally, the definition of first author ("main author") and contributors (co-authors) and of their order in the publication considers issues of hierarchy among scientists or criteria established by leading researchers, involving much subjectivity.

According to the International Committee of Medical Journal Editors[1] (ICMJE), all authors of or contributors to a scientific document (article, text, report, project) must have contributed to four activities: 1) conception or design of the study and acquisition, analysis and interpretation of data; 2) drafting the article or critically revising it for substantial content; 3) approval of a version of the document or final text; 4) accountability agreement to guarantee the fidelity and integrity of the study.

Although there are important publications with ethical principles and arguments about authorship, there is still no consensus on who should be considered an author. This thematic review proposes considerations and criteria to determine the authors and order of authorship in scientific articles.

What is authorship?

Authorship relates to identifying the people who contributed in a representative and noticeable way to the research, in an order that shows the nature and relevance of their contribution[2]. In general, the author of a scientific document is the person who developed it entirely (single author) or the group of co-authors who participated significantly in the study. Erlen et al.[3] consider as authors those whose contribution to the research and scientific text is relevant and as co-authors those who participate with "*similar accountability*" to that of the author.

Through peer review, journals must certify that the published knowledge complies with the rules of the scientific method and guarantee the intellectual property of the ideas or opinions disclosed[4-6]. It should be noted that authorship is unrelated to profession, position, hierarchy or employment relationship and is attributed based on contributions to scientific documents or research.

The persons cited as authors must be competent for authorship and therefore have participated adequately in the study to publicly guarantee its content. In addition, one or more authors must be accountable for the entire work, from the beginning to its publication[5,7]. Generally, authorship of multicenter studies is attributed to a group, so all members must fully meet all of the aforementioned authorship criteria. Those who do not meet such criteria may be included, with their authorization, under "Acknowledgments". A good practice in some publications has been the inclusion in the manuscript of a section called "Contribution of the authors," where the contribution of each one is described, reducing to some extent the subjectivity in attributing authorship[5,6].

In thematic review articles, all authors must take part in the critical analysis of the papers, articles and documents included as bibliographic references. Likewise, in outlines, memoirs, scientific-technical reports and other texts addressed to third parties, the list of researchers must be included following the same terms and conditions of a scientific publication.

Why is authorship relevant in scientific articles?

Authorship confers academic and social prestige and, in some cases, financial gains to researchers and contributors. The author is committed to disclosing a scientific or technological finding, but is also entitled to having his work recognized by the academic community, which attests to the quality of his contributions[8,9]. For example, in Mexico, the National System of Researchers (SNI in the Spanish abbreviation) was established in 1984 with the purpose of acclaiming the work of professionals dedicated to scientific and technological knowledge[8]. In this system, recognition is determined by peer review and consists of conferring the title of "national researcher", which denotes the importance and credit of scientific contributions. Nevertheless, regardless of such distinctions, authorship always implies transparency and commitment to the works submitted for publication[9].

Institutions could measure the output of their researchers by identifying in how many publications they were the lead authors, which would influence in some way the allocation of resources or the granting of incentives. However, this depends on the institution to which each researcher is linked[10].

Who should be author and who should be first author?

Identifying authorship in scientific articles is a key task which in many cases is not undertaken with due seriousness. The difficulties in determining who should be the first author (the "main author") arise when the contribution of each participant in the different stages of researching and writing the work are not adequately estimated, or when information regarding the intellectual author (designer) and the practical author (field or laboratory technician) of the work is unknown or inaccurate [11].

In certain areas of scientific knowledge, the order and categories of authorship are not so important. In the biomedical field, however, this order is relevant not only for highlighting the contribution of different authors, but also because some institutions rate the first author more highly than other contributors or the corresponding author [12]. Although there is no global consensus, the most common practice is to identify the lead or main researcher of the project as the first author, depending on the subject and number of authors [7,13].

So far the first author has been subjectively determined, ignoring standards related to "author's right", intellectual property and professional ethics and disregarding academic participation and practical experience of co-authors or contributors [14]. Indeed, there are few quantitative instruments in the literature to determine the authorship and co-authorship of a work, although some guidelines have been published setting out a few general principles.

The list of authors of a work can and should be determined at the beginning of the project, with responsibilities specified in a verbal or written agreement [15,16]. However, attribution of authorship may vary during the development of the work for several reasons. That is why it is essential to design an evaluation form to quantitatively measure the contributions of authors at any stage of the research [17].

Once the study is concluded, it is important to define the contributions to the achievement of results, establishing the order of authorship, as long as everyone contributes to the writing and critical review of the work. Acosta [11] designed a system that can be used by professionals and institutions, bearing in mind that this is a task undertaken by researchers or their institution and not by editorial boards and committees of scientific journals. Since journals generally do not provide guidance regarding the authorship of work or the listing order, it would be convenient to have this defined by consensus among all authors [12,15].

Activities such as procuring funding, obtaining data, providing routine information (for example, from the surveillance system), recruiting subjects for experiments or processing samples without added value, among others, must be recognized in the acknowledgments section and do not justify inclusion as author. It is convenient to explain from the beginning to people hired to provide technical support in processing samples or collecting data that they will not be identified as authors of the study.

Anyone linked to a research team who, based on their position of power or employment, demands to be listed as an author is violating academic autonomy and the principle of equity. On the other hand, omission of a contributor in documents or publications derived from a scientific project implies an illicit and unjust denial of authorship and violates the rules of intellectual property. As for the order of authors, the first (or main) author is that who made the most relevant contributions to the work and prepared the reports and outlines submitted for publication. In turn, the senior researcher in charge of supervising the research project will be included as the last author; the other authors will be listed in order of importance or, depending on the work, in alphabetical order.

The corresponding author is in charge of communicating and interacting with the editorial board of the journal to which the work was submitted, throughout the entire publishing process and for future requests arising from publication [4,7,12,16-18]. This author must meet the logistical and administrative requirements encountered and provide data on authorship, approvals from ethics and research committees, information from the study, potential conflicts of interest and documents requested by editors [12,19,20].

When any of the authors cannot assume responsibility for the full content of a work, their contributions will be included in a specific and independent manner, except in cases where this matter is already regulated by editorial standards. On the other hand, there is the possibility of justifying the order of authors in a footnote. For example, when a co-author has contributed to the writing of the article, his or her commitment is on a par with that of the main author and therefore he or she should enjoy the same status. The situation should be made evident in the publication or in texts derived from the work. The same criterion applies to senior authors [21].

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Who should be included in the acknowledgments?

As previously mentioned, the "Acknowledgments" section lists the participants who do not meet the inclusion criteria as authors, but who carried out activities such as funding procurement, supervision of research groups, administrative support, support in writing, style correction, technical editing, sample processing, organization of data with no added value, technical assistance, testing correction, statistical analysis or overall support (from a department head, for example). Contribution of financial and material resources should also be recognized in the acknowledgments [15,16,19].

The lists of authors may also include people whose contributions to the manuscript were not so substantial. These can be credited as "clinical researchers" or "participating researchers" whose function or contribution can be explained in several ways: "provided scientific advice"; "critically reviewed the study protocol"; "processed samples"; "recorded information"; or "assisted patients (or participants) in this research." In order to avoid confusion or misunderstanding, written authorization to be included in the acknowledgments must be requested from all such participants [17,22].

What is conflict of interest?

In conflict of interest, a person's private interests (the author in this case) interfere in the conduct of the research or in the writing of the final document, biasing it towards a specific person or institution [23,24]. In research or clinical practice the term is used in situations where professional evaluation has been influenced by a primary interest. In addition, the validity of the research may also be affected by secondary interests such as an economic or academic benefit (professional recognition), or by urgency to publish.

It is common for researchers to be subjected to several conflicts that influence the results of their studies and give the impression of submission to the interests of third parties. The presence of conflict of interest, however, does not disqualify the integrity of a researcher or the scientific merit of his or her work. It is important to analyze how the benefits are treated so that the primary interest is not affected by secondary interests [15,23,24].

Efforts to regulate conflict of interest in scientific publications do not aim to ignore financial benefits or aspirations for academic prestige, but rather to incorporate good practices into the scientific environment. Therefore, authors should expose the existence of such conflicts to the editorial board without fear of invalidating the study.

Confidentiality in scientific publications

Content disclosed privately or involving mutual security between two or more persons is called "confidential." Confidentiality relates to ensuring to the discloser the protection of secret or privileged information disclosed [25].

Texts submitted to editors of scientific journals are considered confidential communication and authors may be harmed by the early disclosure of part or all of a publication. Thus, the editorial board must commit not to disclose information, comments or decisions about the manuscripts received before publication, except to the actual authors and reviewers. Editors must therefore ensure that these documents are protected and safeguarded, eliminating manuscript copies, whether in print or electronic format, once the evaluation is concluded [26].

Assignment of author's rights

"Assignment of intellectual property rights" is the document by which one person transfers to another the author's rights over his or her texts [27]. The editorial boards of scientific journals may ask the group of researchers to assign their rights to the journal, which it does not mean that they lose credit as authors of the work, but that they grant the publishing and commercial rights typical of the publishing process.

On the other hand, the internet has opened up several possibilities for disseminating knowledge, such as Open Access, which has changed the manner of disclosing the results of scientific research. Open Access includes initiatives that provide free and unrestricted access to work by the academic community as a means of protection against misuse. Open access does not mean that authors waive their rights over their work, but that they are free to choose how they want to protect such rights and disclose their work [28].

Critical reflection on "authorship ethics"

Determining scientific authorship is a complex problem delimited by ethical aspects and principles, which implies problems of integrity and scientific responsibility. That is why it is relevant to have clear and objective guidelines for attributing authorship. Therefore, we propose the following recommendations should be considered:

1. To assign clearly and in detail the responsibilities of each researcher from the outset of the project.
2. To define the order of authorship for the different manuscripts derived from the initial project. This activity must involve all research participants.
3. To set down in writing the agreements and decisions regarding the production and authorship of articles, establishing also who should be included in the acknowledgments section.
4. To develop objective guidelines and checklists to reduce conflicts regarding authorship. These guidelines should include and quantify, beyond doubt, the four criteria discussed above: participation in the study design; data acquisition or analysis; writing or critically revising the manuscript; and final approval of the manuscript.
5. To encourage respect for author's right, intellectual property and good practices.
6. If the project is entirely or partly carried out by students (undergraduate work), it must be made clear that they will be the main authors of the scientific products derived from the development of their work and that under no circumstances will this right be attributed the group's supervisor, coordinator or leader. Likewise, *Colombian law considers as the sole and exclusive author of the work (undergraduate work, thesis) the person who organized, collected, expressed, recompiled and formulated in writing his or her ideas, including the guidelines and ideas presented by the supervisor in that work*[29]. However, the student must fully meet the four criteria above to be considered as the first or single author. Otherwise, he or she should share authorship with people who substantially contributed to the development of the project (other students, supervisor, researchers from the research group or the original project, among others).

It has recently been proposed to explicitly mention the individual contribution of the authors as a complement to the Vancouver recommendations. Besides the inclusion of an exact description of the tasks performed by each participant, the role of the guarantor is created. This is an author who, in addition to meeting the authorship criteria, makes an additional effort to guarantee, endorse and be accountable for the scientific integrity of the project as a whole, before and after publication.

Journals that have adopted authorship by contribution guidelines, which obviously are not incompatible with the authorship requirements of the International Committee of Medical Journal Editors, generally publish such information in a footnote on the title page, in an appendix before the acknowledgments or at the end of the article. The system promotes good practices and contributes to inform precisely who did the work, discouraging the inclusion of ghost authors, guest authors or courtesy authorships[30-33].

Conclusions

The attribution of authorship is a persisting ethical problem in scientific publications, hence the importance of researchers adopting good practices and policies to eliminate undesirable procedures.

Although guidelines have been established to define authorship, doubts still persist among editors, authors or co-authors, in addition to ethically incorrect behavior, much of it due to, but not justified by, the competitiveness within academia. Among such unacceptable behavior Bennet and Taylor[33] include dilution of responsibility or unfair distribution of authorship credit, guest, courtesy or gift authorship, "pressured" and "ghost" authorship or exclusion of authors, not to mention duplicate publication and fraud.

It is recommended that each institution or group of researchers establish authorship from the planning phase of the research and have available, as far as possible, a scale for measuring contributions to define the order of the authors list. As a general guideline, such agreements must be set down in writing due to the occurrence of adjustments throughout the research.

Lastly, to strengthen authorship elements, higher education institutions must incorporate subjects to provide comprehensive training in professional ethics and clarify the role of students, supervisors and researchers in scientific publications.

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References

1. International Committee of Medical Journal Editors. Recomendaciones para la preparación, presentación, edición y publicación de trabajos académicos en revistas médicas. Rev Esp Salud Pública [Internet]. 2016 [acesso 18 jun 2018];90:1-27. Disponível: https://bit.ly/2F2tQPv
2. González-Guitián C. Sobre autoría na publicación científica: quen é autor e quen colaborador? [Internet]. In: VI Xornada Bibliosaúde; 8-9 jun 2017; Santiago de Compostela. Santiago de Compostela: Xunta de Galicia; 2017 [acesso 18 jun 2018]. Disponível: https://bit.ly/2MHHhsi
3. Erlen JA, Siminoff LA, Sereika SM, Sutton LB. Multiple authorship: issues and recommendations. J Prof Nurs [Internet]. 1997 [acesso 18 jun 2018];13(4):262-70. DOI: 10.1016/s8755-7223(97)80097-x
4. Ruíz-Pérez R, Marcos-Cartagena D, López-Cózar ED. La autoría científica en las áreas de ciencia y tecnología: políticas internacionales y prácticas editoriales en las revistas científicas españolas. Rev Esp Doc Cient [Internet]. 2014 [acesso 18 jun 2018];37(2):e049. DOI: 10.3989/redc.2014.2.1113
5. Stocks A, Simcoe D, Toroser D, DeTora L. Substantial contribution and accountability: best authorship practices for medical writers in biomedical publications. Curr Med Res Opin [Internet]. 2018 [acesso 18 jun 2018];34(6):1163-8. DOI: 10.1080/03007995.2018.1451832
6. Matheson A. The ICMJE Recommendations and pharmaceutical marketing: strengths, weaknesses and the unsolved problem of attribution in publication ethics. BMC Med Ethics [Internet]. 2016 [acesso 18 jun 2018];17:20. DOI: 10.1186/s12910-016-0103-7
7. Petroianu A. Autoria de um trabalho científico. Rev Assoc Méd Bras [Internet]. 2002 [acesso 19 jun 2018];48(1):60-5. DOI: 10.1590/S0104-42302002000100034
8. Sistema Nacional de Investigadores. Gobierno de México [Internet]. [s.d.] [acesso 18 jun 2018]. Disponível: https://bit.ly/37lX0VJ
9. Monteiro R, Jatene FB, Goldenberg S, Población DA, Pellizzon RF. Authorship criteria for scientific papers: a polemic and delicate subject. Rev Bras Cir Cardiovasc [Internet]. 2004 [acesso 18 jun 2018];19(4):III-VIII. DOI: 10.1590/S0102-76382004000400002
10. Mowatt G, Shirran L, Grimshaw JM, Rennie D, Flanagin A, Yank V *et al*. Prevalence of honorary and ghost authorship in Cochrane reviews. Jama [Internet]. 2002 [acesso 18 jun 2018];287(21):2769-71. DOI: 10.1001/jama.287.21.2769
11. Acosta A. Cómo definir autoría y orden de autoría en artículos científicos usando criterios cuantitativos. Univ Sci [Internet]. 2007 [acesso 18 jun 2018];12(1):67-81. Disponível: https://bit.ly/36bj3yi
12. Phillippi JC, Likis FE, Tilden EL. Authorship grids: practical tools to facilitate collaboration and ethical publication. Res Nurs Health [Internet]. 2018 [acesso 18 jun 2018];41(2):195-208. DOI: 10.1002/nur.21856
13. Ilarraza-Lomelí H, García-Saldivia M. En un documento científico: ¿quién debe ser el primer autor? Arch Cardiol Mex [Internet]. 2015 [acesso 18 jun 2018];85(2):93-5. DOI: 10.1016/j.acmx.2015.05.001
14. Autores. Ediciones Digitales [Internet]. [s.d.] [acesso 20 jun 2018]. Disponível: https://bit.ly/39tz3O3
15. Jabbehdari S, Walsh JP. Authorship norms and project structures in science. Sci Technol Human Values [Internet]. 2017 [acesso 20 jun 2018];42(5):872-900. DOI: 10.1177/0162243917697192
16. Orellana D, Hermida MA, Osorio P. Lineamientos para autoría de publicaciones científicas. Coyunt [Internet]. 2018 [acesso 20 jun 2018];22:81-90. Disponível: https://bit.ly/2SBnK0p
17. Reyes H, Palma J, Andresen M. Los criterios de autoría de trabajos científicos: traducción al castellano de la versión más reciente del documento "Requisitos uniformes para los manuscritos sometidos a revistas biomédicas". Rev Méd Chile [Internet]. 2002 [acesso 20 jun 2018];130(10):1177-8. DOI: 10.4067/S0034-98872002001000014
18. Burrows S, Moore M. Trends in authorship order in biomedical research publications. J Electron Resour Med Libr [Internet]. 2011 [acesso 20 jun 2018];8(2):155-68. DOI: 10.1080/15424065.2011.576613
19. Corrêa EA Jr, Silva FN, Costa LF, Amancio DR. Patterns of authors contribution in scientific manuscripts. J Informetr [Internet]. 2017 [acesso 20 jun 2018];11(2):498-510. DOI: 10.1016/j.joi.2017.03.003
20. Cetzal-Ix W. Responsabilidades e implicaciones del "autor para la correspondencia" (corresponding author) en los artículos científicos. Desde el Herbario CICY [Internet]. 2014 [acesso 2 jan 2020];6:5-8. Disponível: https://bit.ly/2SKWqgf
21. Universitat Internacional de Catalunya. Autoría de trabajos científicos [Internet]. [s.d.] [acesso 3 jul 2018]. Disponível: https://bit.ly/2QiBITt
22. Ackerman M, Brânzei S. The authorship dilemma: alphabetical or contribution? Auton Agent Multi-Agent Syst [Internet]. 2017 [acesso 20 jun 2018];31(5):1077-93. DOI: 10.1007/s10458-016-9351-7
23. Carobene MG. El conflicto de interés en la investigación científica. Rev Argent Microbiol [Internet]. 2013 [acesso 6 jul 2018];45(3):145-6. DOI: 10.1016/S0325-7541(13)70014-2
24. Sax JK. Financial conflicts of interest in science. Ann Health Law [Internet]. 2012 [acesso 13 jul 2018];21(2):291-327. Disponível: https://bit.ly/39CgFTx
25. Anguita V, Sotomayor A. ¿Confidencialidad, anonimato?: las otras promesas de la investigación. Acta Bioeth [Internet]. 2011 [acesso 6 jul 2018];17(2):199-204. DOI: 10.4067/S1726-569X2011000200006
26. International Committee of Medical Journal Editors. Recommendations for the conduct, reporting, editing, and publication of scholarly work in medical journals [Internet]. Vancouver: ICMJE; 2014 [acesso 13 jul 2018]. F. Fees; p. 11. Disponível: https://bit.ly/2FgrrRo

27. Wonder Legal España. Contrato de cesión de derechos de autor [Internet]. 2018 [acesso 6 jul 2018]. Disponível: https://bit.ly/2SL3XM3
28. Universidad Pública de Navarra. Biblioteca Liburutegia. Derechos de autor y acceso abierto [Internet]. [s.d.] [acesso 7 dez 2018] Disponível: https://bit.ly/2SLYwfH
29. Centro Colombiano de Derecho de Autor. Circular Nro. 6. Derechos de autor en el ámbito universitario [Internet]. 15 abr 2002 [acesso 10 ago 2019]. Disponível: https://bit.ly/2UZa7sU
30. Albert T, Wager E. How to handle authorship disputes: a guide for new researchers. The Cope Report [Internet]. 2003 [acesso 10 out 2019]:32-4. DOI: 10.24318/cope.2018.1.1
31. Wager E. Do medical journals provide clear and consistent guidelines on authorship? MedGenMed [Internet]. 2007 [acesso 10 out 2019];9(3):16. Disponível: https://bit.ly/2MQfAxk
32. Wager E, Kleinert S. Responsible research publication: international standards for authors: a position statement developed at the 2nd World Conference on Research Integrity [Internet]. 2011 [acesso 10 out 2019]. Disponível: https://bit.ly/2ZLd7cX
33. Bennet DM, Taylor DM. Unethical practices in authorship of scientific papers. Emerg Med [Internet]. 2003 [acesso 10 out 2019];15(3):263-70. DOI: 10.1046/j.1442-2026.2003.00432.x

Participation of the authors
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